

# STRUCTURE OF A CAR VACUUM CLEANER

## REFERENCE TO RELATED APPLICATIONS

This Patent Application is a Continuation-in-Part Patent Application of Serial #10/368,552, filed 20 February 2003, entitled "An Improvement on a Car Vacuum Cleaner".

## BACKGROUND OF THE INVENTION

### 5 1. Field of the invention

The present invention relates to a car vacuum cleaner, more particularly one, which is equipped with a handle capable of pivoting to a normal position for allowing the user to lift the cleaner as well as a second position for the cleaner to be hung outside a car with the handle  
10 being hooked onto an upper edge of a window so that small dust, particulates, hot exhaust and so on are prevented from passing into the car again that have passed through the filtering net of the cleaner while the cleaner is being used.

### 2. Brief Description of the Prior Art

15 Referring to Fig. 9, a prior car vacuum cleaner was disclosed on a patent application, "AN IMPROVEMENT ON A CAR VACUUM CLEANER" with application number 10/368,552, with U.S. Patent and Trademark Office on Feb. 20<sup>th</sup>, 2003 by the inventor of the present invention.

20 The prior car vacuum cleaner includes:

a housing 11; the housing 11 has a holding room 111, and a support 112, which is disposed in the holding room 111, and which has several vent holes 1121 thereon; a filtering net 1122 is secured to the support 112;

a supporting plate 1131 is fixed to the support 112 by means of screws 1133 while a motor 113 is secured to the supporting plate 1131 by means of screws 1134, and is connected to a fan 1132; the housing 11 further has threads 114 on an outer side of an inner end; a cover 13, which has threads 131 on an inner side, is screwed onto the threaded inner end of the housing 11 to cover the inner end of the housing 11; the housing 11 has a cord holding chamber 116 on the bottom, in which a cord 1162 can be held when the vacuum cleaner is not used; a cover 1161 is provided for covering the cord holding chamber 116 with; a reel portion 117 is formed between two ends of the housing 11; the housing 11 has a first connecting protrusion 118 at the inner end, which has a central cylindrical hole, and pinholes 1181 communicating with the central cylindrical hole; the housing 11 has a second connecting protrusion 119 opposite to the first connecting protrusion 118, which protrusion 119 has an engaging gap;

a flexible host 14 for air to pass into the housing 11 through it; the flexible host 14 can be wound around the reel portion 117 of the housing 11 when it is not used;

a louver window 115 detachably joined to an outer end of the housing 11; the louver window 115 has several rows of spaced sloping plates 1153, and vent holes 1154 between the sloping plates 1153; the sloping plates 1153 are capable of guiding air outside and preventing dust from passing into the housing 11; the louver window 115 has engaging

projections 1151, and a flexible plate 1152 for engaging the housing 11 to secure the louver window 115 in position;

a handle 12; the handle 12 is pivotally connected to the housing 11 with a connecting projection 121 thereof being inserted into the central  
5 cylindrical hole of the first connecting protrusion 118; pins 1182 are inserted into the pinholes 1181 and an annular trench 1211 formed on the connecting projection 121 to prevent the handle 12 from separating from the housing 11; the handle 12 has an engaging protrusion 122, and a gap (not numbered) at the second end; the handle 12 can be secured in a  
10 normal position with the engaging protrusion 122 being fitted into the engaging gap of the second connecting protrusion 119 so that the user can lift the cleaner by the handle 12; the handle 12 has a frame 123 between two ends; after having been wound around the reel portion 117 of the housing 11, the flexible host 14 will be pressed in position to not  
15 become loose by means of the frame 123 when the frame 123 is secured in the normal position.

When the cleaner is used in a car, air is forced to travel outside from the car via the filtering net 1122, the vent holes 1121 and the louver window 115 with the net 1122 stopping dust, dirt etc. in the air from  
20 passing outside again; the engaging protrusion 122 of the handle 12 is joined to the second connecting protrusion 119 of the housing 11 for allowing the user to lift the vacuum cleaner by the handle 12.

The vacuum cleaner can be hung outside a car with the louver

window 115 being disposed outwardly of the car, and with the second end of the handle 12 being hooked onto an upper edge of a window of the car after the handle 12 has been turned for one hundred and eighty degrees from the normal position thereof. Thus, small dust and particulates in the air, and hot exhaust are prevented from passing into the car again that have been passed through the filtering net 1122 when the vacuum cleaner is used to clean inside of the car. And, most of noise produced by the vacuum cleaner is kept outside the car by the window of the car.

10        When the vacuum cleaner is not used, the flexible host 14 is wound around the reel portion 117, and the engaging protrusion 122 of the handle 12 is engaged with the second connecting protrusion 119 of the housing 11 so that the frame 123 of the handle 12 can press the host 14 in position, preventing the host 14 from becoming loose.

15        If the motor 113 needs repair or replacement, the louver window 115 has to be first removed from the housing 11 by means of disengaging the engaging projections 1151, and the flexible plate 1152 from the housing 11. If the filtering net 1122 needs cleaning or replacement, the user only has to first remove the cover 13 to be able to reach the net 1133.

20        The vacuum cleaner can be hung outside a car by the handle 12 when it is used to clean inside of the car therefore hot exhaust, and small dust and particulates in the air that are so small as to pass through the net

1122 are prevented from passing into the car again, not going to damage health of the user or make the user uncomfortable. And, when the handle 12 is secured in the normal position after the host 14 has been wound around the reel portion 117, the handle 12 can prevent the host 14 from becoming loose, therefore the vacuum cleaner is easy to store when it is not used.

It can be understood that the above car vacuum cleaner is more convenient to use than other ones that are not equipped with adjustable handles or incapable of being easily hung outside a car. However, it is found that there is room for improvement in respect of the handle 12 and those parts of the housing 11 that are associated with the handle.

## SUMMARY OF THE INVENTION

It is a main object of the present invention to make an improvement on the above car vacuum cleaner so that the handle of the cleaner is easier to operate, and the cleaner is still more convenient to use.

The cleaner has a housing, and a handle; the handle is pivoted to a first end of the housing at one end, and releasably engaged with a second end of the housing at an engaging protrusion at other end; the handle is formed such as to be capable of being hooked onto an upper edge of a window of a car with an air outlet of the housing facing outwardly of the car after the engaging protrusion has been disengaged from the housing,

and after the handle has been pivoted away from the second end of the housing. Therefore, the vacuum cleaner can be hung outside a car when the cleaner is used to vacuum inside of the car. The handle can be made in such a manner as to be up and down pivotally connected to the first  
5 end of the housing. And, the handle also can be made in such a manner as to be left and right pivotally connected to the first end of the housing.

### BRIEF DESCRIPTION OF THE DRAWINGS

10 The present invention will be better understood by referring to the accompanying drawings, wherein:

Fig. 1 is an exploded perspective view of the car vacuum cleaner according to the first embodiment,

15 Fig. 2 is a cross-sectional view of the car vacuum cleaner according to the first embodiment,

Fig. 3 is a front view of the car vacuum cleaner according to the first embodiment,

Fig. 4 is a view of the car vacuum cleaner of the first embodiment,  
20 hung on a window of a car,

Fig. 5 is an exploded perspective view of the car vacuum cleaner according to the second embodiment,

Fig. 6 is a cross-sectional view of the car vacuum cleaner according

to the second embodiment,

Fig. 7 is a front view of the car vacuum cleaner according to the second embodiment,

Fig. 8 is a view of the car vacuum cleaner of the second  
5 embodiment, hung on a window of a car, and

Fig. 9 is an exploded perspective of the prior car vacuum cleaner as described in the Background.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Referring to Figs. 1, and 2, a first preferred embodiment of a car vacuum cleaner in the present invention includes a housing 2, a handle 3, a filtering net 25, a motor 24, a fan 241 connected to the motor 24, a cover 23 connected to an inner end of the housing 2, a louver window 22  
15 connected to an outer end of the housing 2, and a flexible host 211; the housing 2 has a middle reel portion 21 between the inner and the outer ends thereof for allowing the host 211 to be wound around; the filtering net 25, the motor 24, the cover 23, and the flexible host 211 are connected to the housing 2 in the same way as the prior car vacuum  
20 cleaner described in the Background therefore it is not detailed again herein. The characteristics of the present car vacuum cleaner lie in the handle 3, and those parts of the housing 2 that are associated with the handle 3, which will be detailed hereinafter.

The handle 3 has a first connecting end portion 31 at one end, an elastic second connecting portion 34 at the other end, and a middle securing frame 33 between the portions 31 and 34. The first connecting end portion 31 has two juxtaposed parts having horizontal extending through holes 311 aligned with each other. The second elastic connecting portion 34 has an engaging protrusion 341 formed at a downwards-projecting section thereof to face the frame 33. A guiding gap 36 is formed between the frame 33 and the downwards-projecting section of the second connecting portion 34. The handle 3 further has an engaging trench 35 formed above the guiding gap 36.

The housing 2 has a first connecting portion 26 at an upper side of the inner end thereof, and a second connecting portion at an upper side of the outer end thereof, which is formed with an engaging hole 27, and which is folded towards the inner end of the housing 2 at two ends thereof to have two guiding sections 271. The first connecting portion 26 has a horizontal extending pivotal hole 261.

To couple the handle 3 to the housing 2, the juxtaposed parts of the first connecting end portion 31 of the handle 3 are first positioned on two sides of the first connecting portion 26 of the housing 2 with the holes 311 being aligned with the pivotal hole 26. Then, a pivotal pin 32 is passed into the holes 311, and 26. Thus, the handle 3 is pivoted to the first connecting portion 26 of the housing 2, and can be pivoted up and down over a vertical plane; the handle 3 can be securely disposed in a

normal position where the securing frame 33 thereof is right above the reel portion 21 of the housing 2, and the engaging protrusion 341 is engaged with the engaging hole 27 so that a user can lift the vacuum cleaner by the handle 3 when he/she is using the cleaner. Referring to Fig. 4, the engaging protrusion 341 is disengaged from the engaging hole 27, and the handle 3 is pivoted away from the engaging hole 27 over a vertical plane, and hooked onto an upper edge of a window of a car at the engaging trench 35 with the louver window 22 facing outwardly of the car; thus, the vacuum cleaner is hung outside the car, and in turns, hot exhaust, and small dust and particulates in the air that are so small as to pass through the net 25 are prevented from passing into the car again when the cleaner is used to clean inside of the car. Referring to Fig. 2 again, when the handle 3 is secured in the normal position after the host 211 has been wound around the reel portion 21, the securing frame 33 of the handle 3 can prevent the host 211 from becoming loose.

Referring to Figs. 5 to 8, a second embodiment of a car vacuum cleaner is the same as the first embodiment in respect of filtering net 25, motor 24, fan 241, cover 23, louver window 22, and a flexible host 211, but is slightly different from the first embodiment in handle 3, and those parts of the housing 2 that are associated with the handle 3.

The handle 3 in the second embodiment is connected to the housing 2 in such a manner as to be capable of pivoting on the housing 2 left and right over a horizontal plane; the handle 3 has a securing frame 33, a first

connecting portion 37, which projects down from the first end, and which is formed with an annular trench 371; the handle 3 has an engaging protrusion 341 at an elastic second end portion 34 thereof, a guiding gap 36, and an engaging trench 35 at the second end. The housing 3 has a first connecting portion 28 at an inner end, and a second connecting portion at an outer end, which is formed with an engaging hole 29, and which is folded towards the inner end of the housing 2 at two ends thereof to have two guiding sections 291. The first connecting portion 28 has a vertical pivotal hole 281, and through holes 282 extending from outside to the pivotal hole 281. The handle 3 is pivoted to the first connecting portion 28 of the housing with the first connecting portion 37 thereof being passed into the pivotal hole 281; pins 372 are fitted into the through holes 282, and passed onto the annular trench 371 to prevent the handle 3 from separating from the housing 2. Thus, the handle 3 can be securely disposed in a normal position, as shown in Fig. 6, where the securing frame 33 is right above the reel portion 21 of the housing 2, and the engaging protrusion 341 is engaged with the engaging hole 29 so that a user can lift the vacuum cleaner by the handle 3 when he/she is using the cleaner. Referring to Fig. 8, the engaging protrusion 341 is disengaged from the engaging hole 29, and the handle 3 is pivoted away from the engaging hole 29 over a horizontal plane, and hooked onto an upper edge of a window of a car at the guiding gap 36 with the louver window 22 facing outwardly of the car; thus, the vacuum cleaner

is hung outside the car when it is used.

From the above description, it can be easily understood that the cleaner can be easily hung on a window of the car outside for preventing hot exhaust, and small dust in the air from passing into the car again that are so small as to pass through the net 25 when the cleaner is used to vacuum the inside of the car. The handles of both embodiments are respectively turnable over vertical, and horizontal planes. And, the engaging protrusions 341 of the handles in both embodiments are formed such that they can be easily engaged with, and disengaged from, the respective engaging holes 27, 29 of the housings, and in turns, the handles are easy to use.

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